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Davis, CA

National Pesticide Management Course Alumni Responses to Questionnaire - A Post Evaluation of the 1986, 1989, and 1991 Courses

FPM 94-1
October 1993

United States
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National Pesticide Management Course
Alumni Responses to Questionnaire - A
Post Evaluation of the 1986, 1989, and
1991 Courses

Prepared by:

Patricia J. Skyler and
John W. Barry

USDA Forest Service
Forest Pest Management
2121C Second Street
Davis, CA 95616
(916)551-1715
FAX (916)757-8383

ABSTRACT

USDA Forest Service, Forest Pest Management, through its national steering committee for national pesticide use management training and the National Advanced Resource Technology Center, canvassed alumni of the past three courses held in 1986, 1989, and 1991 at Marana, Arizona. The purpose of the canvassing was to determine how the training may have assisted the alumni in their job assignments. A 48 percent return rate was realized. The responses are characterized as positive and supportive of the national pesticide training program.

TABLE OF CONTENTS

INTRODUCTION

The Forest Pest Management (FPM) national steering committee that evaluates pesticide use management training needs and makes recommendations to the Director, FPM, suggested that alumni of the past three national courses held in 1986, 1989, and 1991 be canvassed. The purpose of the canvassing was primarily to determine how the course may have helped them in their job assignments. Such information would be valuable in planning future courses. The canvassing, which was done via a questionnaire prepared by the authors, also provided an opportunity to pursue other related questions. This report consolidates the responses and remarks from the alumni. There was a 48 percent questionnaire return which is considered a high return rate. Thanks to each of those who participated in the canvassing.

3.	Organization	1
4.	Are you currently involved in one of these categories - planning, conducting, supervising, monitoring, or reporting pesticide use projects?	2
5.	How would you describe, in one sentence, your recollection of the subjects and presentations at Marina?	2
6.	How has the course helped you generally and specifically (give examples) in accomplishing your job?	7
7.	Would you recommend the course to others in your organization?	15
8.	How many others in your organization might be in need of the course and want to attend one in the future?	16
9.	The course has been - very useful, generally useful, slightly useful, not useful.	17

TABLE OF CONTENTS

	<u>Page</u>
Abstract	i
Introduction	ii
Consolidated Responses to Alumni Questionnaire	
1. Job title and assignment (management, supervisor, staff, technician)	1
2. Does your assignment include pesticide-use management?	1
3. Organization	1
4. Are you currently involved in one of these categories - planning, conducting, supervising, monitoring, or reporting pesticide-use projects?	2
5. How would you describe, in one sentence, your recollection of the subjects and presentations at Marana?	2
6. How has the course helped you <u>generally</u> and <u>specifically</u> (give examples) in accomplishing your job?	7
7. Would you recommend the course to others in your organization?	15
8. How many others in your organization might be in need of the course and want to attend one in the future?	16
9. The course has been - very useful, generally useful, slightly useful, not useful.	17

	<u>Page</u>
10. Given the world focus on ecosystem management, ecosystem restoration, including riparian areas, biodiversity, and concern about established and invading non-native plants, insects, and diseases, what subjects would you like included in future courses?	17
11. Please rate each of the following pesticide pesticide-related course category or subject by placing an X under <u>High</u> , <u>Medium</u> , <u>Low</u> to indicate level of importance.	23
12. Are you interested in being considered as an instructor at Marana?	25
13. Would you like to attend a refresher/update type course at Marana?	25
14. Remarks	26
Conclusion	31
Attachment A	

Consolidated Responses to Alumni Questionnaire

Alumni responses are summarized on the same form that was mailed to alumni of the past three national pesticide courses sponsored by Forest Pest Management and conducted at the National Advanced Resource Center, Pinal Air Park, Arizona.

August 12, 1993

**Alumni Questionnaire
National Pesticide Management Course
(with summary of responses)**

1. Job title and assignment (management, supervisor, staff, technician):

Management	(5)
Supervisor	(14)
Staff	(47)
Technician	(6)
Researcher	(5)

2. Does your assignment include pesticide-use management?

Yes	(67)
No	(10)

3. Organization: A total of 160 questionnaires were mailed to alumni on August 16, 1993 (127 to Forest Service employees and 33 to non-Forest Service employees).

Responses were received from:

Forest Service Employees (60) or 47% response

Non-Forest Service Employees (17) or 52% response

Total responses (77) for a return rate of 48%

4. Are you currently involved in one of these categories - planning, conducting, supervising, monitoring, or reporting pesticide-use projects?

Planning	(33)
Conducting	(28)
Supervising	(25)
Monitoring	(35)
Reporting	(33)
No	(18)

5. How would you describe, in one sentence, your recollection of the subjects and presentations at Marana?

I remember most pretty well; my recall is better on subjects/presentations with hands-on demonstrations.

Outstanding - the combination of classroom and field exercises was great.

An intense course that trains public land managers and officials in practical aspects of pesticide application projects management.

I was exposed to a broad range of monitoring and pesticide application techniques.

An intense bombardment of a huge amount of very valuable information, albeit in a curious setting.

A good overview of a wide variety of topics - which brought me up to speed.

To heavy to herbicides and monitoring of pesticide residues in soil and water. Instruction dominated by people from the southeast.

The NPMC provided an excellent variety of technical and practical information on pesticide use and its effects on the environment and heightened my awareness of forest uses of pesticides.

Good coverage of the topics, but I felt it would be more useful if there had been fuller coverage on practical aspects of calibrating application equipment.

Good practical emphasis.

Generally high quality instructors presenting an important array of subjects.

Good.

It involved project design, implementation and evaluation.

I received a wide spectrum of knowledge in the calibration and use of pesticide application devices and techniques.

Very well done and appropriate.

The course was interesting, enjoyable, and applicable to my work.

Excellent, too much herbicide info, I really didn't need. Try concurrent sessions.

Kept things moving, didn't get bored, and it was useful information.

Good background information which prepared me to ask the right questions along with specifics on aircraft calibration and characterization.

I have a reasonably clear recollection.

They were excellent.

Good course, but too long.

?OK. The details are hazy because I don't use the information.

General familiarity of subjects covered and knowledge of good reference material I can utilize.

Overview of pesticide management theory, practices and science.

A lot of good information presented that I can refer to because of the handouts.

The topics and presentations were for the most part, germane and well presented. The field exercises were the most valuable/useful.

Fairly comprehensive and wide ranging.

After 5, 6 years remember subjects mainly related to conducting, monitoring a pesticide project, very little in planning.

I was at Marana 4 1/2 years ago. I remember the subjects as interesting and timely, and the presentations from a 7.0 to a 10.0 on a scale of 10. I feel it was an excellent course.

Professional presentations.

Vague.

A great learning experience though a little heavy on the monitoring and could have used more time on the application and field problems.

Well-planned, well-presented and quite useful.

The course at Marana covered the use of pesticides from high-level policy to on the ground nuts and bolts.

Overall presentation on use, restrictions of pesticides.

Well done.

Good course.

I recollect approximately 25% of the subject matter but I have references to help me recover a lot more information.

Very good - I just wish we could get support to use herbicides on the forest.

Since I now put on similar education programs I appreciate even more the need to be interactive and "alive" in our instruction - Marana was "alive" for me.

Enlightenment.

Best course and most complete course in pesticide management I've ever taken.

Each segment of the course was totally dependent on the skill (preparedness) of the instructor.

Course material was very useful and directly applicable for project planning and implementation.

For the most part the presentations were informative but not very applicable to my area of interest - monitoring. Only one day was devoted to that.

Good material but some extraneous to my need, eg. aerial spraying and modeling.

Items covered on PI, NEPA, safety, etc. were helpful and provided good discussion.

Very in-depth presentations relating mainly to control of forest insect pests along with excellent safety presentations.

Well presented and practical.

Vaguely.

Those subject areas I use most frequently rank high on the recollection list.

The course I attended provided information and current technology on all aspects of pesticide use and management.

I found the material informative and well-presented.

I attended the first training session - and was new to FPM - it was an excellent introduction for me to pesticide use management.

Subjects were excellent, timely, and helpful to me in my current position.

Hodge-podge - some excellent, some poor - some pertinent, some irrelevant - long.

Current issues and technology in pesticide use and environmental monitoring.

I attended the first training session, and as I remember course content it was mostly all pesticides and at that time we were under injunction.

Varied, interesting and very relevant to my job.

Too much emphasis on aerial application.

Good recollection of subject matter, weak retention of specific technical details.

Since I had worked with pesticides (prior to joining the Forest Service - I was an R&D rep for a chemical co.) for several years prior to the training at Marana, I have a fair recollection of the subjects and presentations.

In general, it was a very good course.

Provided a great deal of the knowledge needed in my current work, either as refresher or new knowledge.

I was in the first course. The presentations were good but the AUDIENCE and the topics did not always mix - there were too many techniques with NO spraying experience. The course should have been more technical - taught to a higher level.

An intensive series of lectures and hands-on exercises that attempted to present the entire realm of pesticide uses.

Worth repeating.

Not too applicable to rangeland management.

I recollect a lot of material on many subjects over a long two weeks.

Most of the presenters prepared themselves very well and taught us well, but the course planners put too much emphasis on NEPA, a topic that I did not need further training in.

The Marana subjects were informative and useful.

Subject matter was comprehensive and speakers were well prepared.

6. How has the course helped you generally and specifically (give examples) in accomplishing your job?

General: Discussion on public involvement and informed consent broadened my outlook.

Specific: Hands-on field exercises on calibration and monitoring supplied needed skills. Also, this was basis for R-5 training in 1989.

Generally, the course provided me with information and reference materials which I can utilize when needed.

Generally: The course updated my knowledge of pesticide application after a 10 year hiatus.

Generally: Awareness of the "environment" (legal and political) in which pesticides are used. Awareness of the details involved in proper pesticide use: eg. effect of water pH on pesticide formulation.

Specifically: Most frequent use is in spray calibration and characterization.

It did not help - generally or specifically.

Much of my job involves being a COR for aerial suppression projects. This involves me in the contract management, cal./char. aircraft inspection etc.

Hasn't really; most of what I heard there was review.

Generally - more confidence in how to design, execute pesticide programs. Specifically - better understanding of application technology; nozzles, equipment, etc.

I am not sure it has as I was already active in spray projects.

Reviewing project proposals - assists me to notice fatal flaws. I am able to be an information source for on forest (and off) personnel. (Note that the course alone would have been insufficient - constant updating is a must).

Generally it has given me a clearer understanding of pesticide use and logistics in a spray project. I have not had the opportunity to use this info on a project yet.

The course reinforced and broadened my understanding of pesticide management. It allowed me to speak about pesticides from a more knowledgeable perspective.

Generally, course has strengthened knowledge of state-of-the-art pesticide management practices. Specifically, the course provides attendees with detailed knowledge of application techniques and delivery systems, monitoring methods.

Improved planning (safety).

Tuned into the objectives, issues, and potential pitfalls of performing a pesticide-use program. Has ensured a high quality, safe program on the Forest.

We have not used pesticides for 10 years now, so I can't site specifics. Gave me a general overview.

The Rocky Mountain Station is doing little or no research on pesticides (chemical or microbial), pheromones, etc, so although what I learned at Marana was interesting from an academic and practical perspective, I really don't use the knowledge gained there on the job. The pesticide use coordinator function at RM has become obsolete.

Provided contacts with many individuals with aspects in all types of forest pesticide applications. Excellent source of reference materials used many times over the past years.

I have referenced the binders (info. in) on several occasions. Particularly for the characterization/calibration info., and FSCBG manual. In general, the course contained too much info that was superfluous to my job.

Learned how to conduct spray program. Learned calibration and coordination. Learned monitoring. Brief intro to risk analysis.

Provided a background and understanding in the use of pesticides. Provided actual field experience in working with aircraft, safety, pesticides. Made professional contacts that I have kept for 7 years.

No longer applicable.

In general, by the diverse exposure to the world of pesticide application, monitoring, EPA, NEPA etc. that has allowed me to crossover into other areas within the Forest Service. Specifically - these areas include land management planning and developing management plans for G. moth.

It helped in working with fixed wing aircraft.

Very helpful in application of aerial insecticides and ground herbicides. However, we currently have no pesticide program on the Forest.

It helped me realize the pest management problems nationwide such as the large gypsy moth program in the East. I also was exposed to the wide variety of equipment available for pest management. Specifically, I applied the safety items in my district's program.

Provided good refresher on many pertinent topics - specifically, course helped reduce potential for errors in our operational program and provided good reference material including notes I made at course.

The point most valuable to me was the part on monitoring. Since the course, I have implemented a very strong and defensible (in court) water monitoring system on this forest.

Generally the course helped me to understand the other aspects of pesticide uses etc. and helped me be able to "speak the language" with the people implementing the projects on my forest.

"Accomplishment" has been significantly retarded by the agency's disinterest in using chemical techniques. The course, while well-planned, is not in line with the political viewpoints of line officers and the general public.

a) Provided me with a list of folks (experts, so to speak) to contact, as needed, during project planning. b) good for the various cooperators to meet and work together. c) first exposure to swathkit occurred at Marana. d) most folks are only interested in either insecticides or herbicides, but not both. The course should be subdivided by area of interest.

Helped me when I was forest pesticide coordinator and also in dealing with pesticide use in land management planning.

Generally it has given me more insight as to what is involved in gypsy moth suppression.

My pesticide work has been on a policy level. Marana gave me a better understanding of how FS conducts application projects which helped with drafting (reviewing) good (?) TES - pesticide policy.

I have a working knowledge of application and have participated in two Bt application programs and one aerial seeding.

I have used portions of the Marana training session during 4 aerial spray projects. In addition I use the information in training sessions.

For the last 5 years the Shawnee NF has used no forest pesticides. So I have had no opportunity to use the training except through general knowledge of pesticides.

Generally: Broaden my knowledge of pesticides. Specifically: Provided very excellent contacts.

Better understanding of the total FS pesticide program - not just noxious weeds. Better background to answer and assess pesticide issues.

Generally - it gave me a better understanding of pesticide use throughout all levels and regions of the FS.

Specifically - it enabled me to participate as part of the training cadre for R-5's pesticide application training and has allowed me to be involved in a large scale (85,000 ac) Bt application project for douglas-fir tussock moth.

Generally, has enabled me to become more aware of the planning required to conduct pesticide projects. Have not had an opportunity to use many of the specifics -- because of the emphasis on aerial applications.

The course has helped me in my work previously in Region 8 and here in R-9, NA to give me a strong pesticide application background as I present information to national forest uses through training sessions. Specifically, as the R-9 pesticide coordinator I go back to my notes for info dealing with specific projects forest proposes and also am working on appeals to projects that bring up pesticides as an issue.

Served as a "refresher" for me - brought me in contact with other specialists.

Generally: Exposure to a broad range of pesticide applications and modes of application. Specifically: Skills learned at NPMC later used include spray equipment calibration and characterization. Aerial spray characteristics useful when working as an aerial observer. I was better able to understand deposition and drift problems observed during actual applications.

Mostly it was a general help, an excellent review of methods of pesticide use, and it helped me specifically in learning about the newer mechanical systems for applying pesticides. Also being able to talk to others who are still using herbicides on a wider basis, and their results and problems.

Very helpful. At the time I had no experience with pesticide use, so the course was a good level for me. Learned much about calibration, characterization, swath-kit, FSCBG and applications.

Generally - more knowledge about application and lingo. Specifically - applied training when I helped to calibrate and characterize aircraft for a spray project.

Generally - a better overall understanding of the wide variety of considerations/concerns related to pesticide use management. Specifically - the field exercises related to aircraft calibration/characterization were very useful in my later work with gypsy moth suppression.

The importance of documentation. The greater understanding at a national level. I know now who to call for help.

Use the information provided to aid and supervise the calibration and characterization of B.t. for aerial application, using Beecomists on helicopters.

Coordinated 84,000 acre aerial application of insecticide project in 1989. Used much of Marana's reference material. Coordinated 5,000 acre vegetation management project on Lassen Forest 1993. This involved ground application of herbicide. Used reference material here also.

? I'm sure there must have been some benefit.

In the planning and analysis for pesticide projects.

As of last Sept. it was some help in running spray programs.

Did a good job of providing knowledge on components of pesticide spray projects ie. work and safety plans, organizational structures, etc. Really helpful in aircraft calibration and characterization. I have had to calibrate and train many others in aircraft calibration. Often use notebook as reference; virtually at least once each year.

It has helped in the characterization and calibration aspects of the gypsy moth suppression project. I have been project director for the last 3 years.

Calibration/characterization aircraft. FSCBG - use and application. Swath kit - use and application.

Helped me better understand deposition from aircraft. Helped in understanding drift and what influences drift.

When pesticide application projects have come along, the training has helped in the planning and implementation phases. I needed training in

calibration and characterization of aircraft and in monitoring spray deposit. The session provided this training very well. The question of spray drift has also been very challenging and exposure to the FSCBG model was excellent.

Excellent tool in using knowledge gained to prepare biol. evaluations - suppression recommendation on small outbreaks of white-marked tussock moth and forest tent caterpillar. Assisted me in preparing better training material on pesticide use and safety for courses involving our personnel.

Generally it made me aware of what our counterparts in FS do in terms of project planning. Also made contacts with individuals in FS. Specifically showed me how to measure and characterize aerially-applied pesticides. I also enjoyed the locust (Africa) presentation.

General - understanding some of the tools available for pesticide management. Specific - ie, swath kit.

Generally: provided me with good background material for my present job. Specifically: served as a good model for how to conduct an effective training course (I got training responsibilities). Served as my "refresher" training to maintain my commercial pesticide applicator's license. Gave me good contacts (students and instructors) who I have called upon for assistance since the course.

Swath testing, public relations, monitoring.

Have been able to use information and techniques from the course in running courses in New Zealand.

In general, the course provided me with a new awareness of the complexities faced by the Forest Service and State agencies in managing pest problems in forests and the limitations in options available for pest control, when balanced with environmental considerations.

Specifically, the course helped me find technical experts to consult with on pesticide projects - I contacted Dr. Steinke when considering a proposal for an aerial application study; I have contacted others to seek information; I have used the course materials as references when speaking to groups on pesticides and environmental issues.

Aircraft calibration and characterization.

It gave me a general background so I know what specific questions I need to ask. Specifically I know more about application techniques and specific herbicides. I am often looked to as an information source and frequently can answer questions without further research.

One of the volumes in the pesticide application compendium series involves forest pesticide application. Obviously, much of the Marana experience was germane to this topic. In addition, the information was often very valuable in a generic sense, providing cross-over education in general areas of pesticide application.

The course generally exposed me to a range of monitoring procedures and technologies that may eventually become important parts of our pest management program. Specifically, the course improved my basic understanding of spray behavior to help us improve insecticide applications for tree protection projects.

Generally - course helped develop an overview of all aspects of pesticide use by government. Such topics as contract administration, public concern and pesticide applications on public lands. Specifically - I use the information learned in the course during our gypsy moth suppression program. I supervise the calibration and characterization of all the spray aircraft used on the project (up to 28 aircraft). I also supervise the spraying of counties in the area that I supervise.

The course background gave me a more comfortable feeling in communicating and/or coordinating aerial spray projects. The handout material gives me an excellent library.

Generally helped the section manage pesticide use and management issues. Specifically enabled us to successfully carry out our technology development project on aerial spray simulation.

7. Would you recommend the course to others in your organization?

Yes (71)

No (6)

No - but I'd like a refresher.

Yes - if they were really doing pesticide research & development.

Yes - but only to those who definitely are involved in pesticide application efforts in a meaningful way.

No - not in the form I saw.

None, unless it is dramatically overhauled.

Yes - definitely.

Yes - provided there was more info on calibration, herbicides, and the course was pre-approved for Colo. State licensing.

Yes - If they were planning on developing an herbicide/insecticide program; not just for general interest. There is too much specific info that would not be retained if not used right away.

Yes - Upper staff levels.

Up to 3 depending on funding.

Yes - especially to folks that will be leaders in training on pesticide application projects.

Yes - if they believe they'll be using herbicides again.

Yes - for those who see themselves in pesticide management some day, but for those new entos with little or no experience.

I wouldn't know who.

This is hard to estimate. The need by others would be in relation to application of herbicides and none is planned at the moment.

Yes - probably for our Regional Pest Management Coordinators, and some field personnel.

8. How many others in your organization might be in need of the course and want to attend one in the future.

Responses ranged from 0 up to 17.

You will derive a better estimate from the collective responses from attendees from each Region, but clearly several hundred USFS employees would benefit from attending.

Don't know.

Every pesticide coordinator at a minimum.

As trainers, there are 3 of us. As participants, none.

I think anyone involved with pesticides, directly or indirectly, should attend.

Possibly as many as 6 or 8, could be interested. Maybe half that could consider it a need. Note R-5 put on a large training program a few years ago, which has served well. I do feel there is more training need. PAPA & Veg Council have helped.

Forest pesticide management coordinator - perhaps district program manager.

I have no idea.

Few; unless public perception on chemical-use changes in the near future.

As the gypsy moth spreads more people will be involved.

Until we have forest support it won't help.

Depends upon the future use of pesticides and ecosystem management.

Not able to guess at this time.

In the NE - FHP, 2-3 people. In R-9 NFS, 4-6 people.

Right now, none. We've had three from this district take the course. If a forest herbicide project were planned, perhaps 1-2 people should go.

One person, however with the distance and cost of travel, the current financial climate makes it unlikely he could attend.

Unsure.

It is doubtful anyone else would be inclined to pursue this topic. this is my area.

One or two regional pest specialists.

9. The course has been:
- | | |
|------------------|------|
| Very useful | (24) |
| Generally useful | (46) |
| Slightly useful | (5) |
| Not useful | (2) |

10. Given the world focus on ecosystem management, ecosystem restoration, including riparian areas, biodiversity, and concern about established and invading non-native plants, insects, and diseases, what subject would you like included in future courses?

What are the real/relative risks of pesticides in the environment? How to balance protection of the environment with production needs. Pest risk assessment with foreign imports (logs).

Biological effects of large spray program. How to present the risks and benefits of pesticide applications to the public.

More emphasis on ground based treatments and species specific management techniques.

Information on strategies for eradication of non-native organisms.

More on the Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990 and its impact on pesticide use in forests, if any. More on endangered species and integrated pest management. More on how to define "Best Management Practices" and the "economic threshold" for pest pressure in non-agricultural settings. More on ecosystems, ground and surface water impacts and habitat objectives. What are the laws, policies and goals.

Include specific case studies to illustrate how spray technology can improve efficacy and or minimize spray drift.

More emphasis on what constitutes the no go aerial spray decisionmaking process.

Litigation is a problem most of us will face sooner or later if we continue in our fields of pest management/chemical applications. Perhaps a "lessons learned" format so others can learn to avoid legal problems. Also, perhaps more info on drift management.

Increase safety session. The evening session on exotic plants was very interesting - this should be folded into the day session and expanded. More information on environmental monitoring and evaluating pesticide effects to non-target organisms.

Worker protection standards. Endangered species (assuming EPA publishes regulations in Dec. '93).

I would like to see discussion on "real life" situations involving pesticide projects which involved treatments in proximity to wilderness areas, national parks, etc. Particularly concentrating on problems that arose and how they were dealt with during the project.

Expansion into no-chemical pesticide opportunities for pest management, ie. use of pheromones for bark beetles and/or defoliators, etc.

Invading plants and their control.

Threatened and endangered species and impacts of certain insecticides. Exotic insect pests.

Risk communication; T&E species - what is necessary (many I have worked with don't know correct Endangered Species Act requirements); drift management; and sampling procedures, environmental fate accountancy.

Basic subjects in ecosystem management and restoration.

The general concepts and technology are still valid. Some important additions to the course might include technology and methods around vegetation control in structurally diverse (multi-story) stands. Of course, the ever-increasing political arena.

Less focus on large scale project and aerial application.

Need more on management of vegetation in the ecosystem. This should include management of vegetation on range land sites, R-O-W's, forest sites, riparian sites, etc.

No suggestions. Keep course focused on technology and out of the land management arena.

More on interactions as mentioned above and personal safety issues. Only was a one-hour course after 7 days of discussing pesticides.

Invading non-native plant management class.

Perhaps greater emphasis on the use/testing of biorationals.

More on spray project analysis - what to consider, methodologies, case studies. Non-target effects. More on ecosystem view of "pests." Emphasis that pesticide application is only a part of a balanced approach to pest management.

More talk about impacts of pesticides on the ecosystem, how to monitor, what techniques for monitoring are available. Most often only look a butterfly here and a bat there, what are the other impacts?? Non-targets.

I think our organization needs to decide what the devil we're actually going to do before I can answer this.

A historic review of pesticide use. A good look at what's new in both pesticides and their application methods. Some practical information on aerial application projects (nuts & bolts).

More emphasis on effects (pesticide) on non-target organisms.

In this region we are trying to deal with several of these areas that I think should be included - Ecosystem Rehabilitation and Restoration (techniques, application technology, etc.), Exotic Pest Mgt., Biodiversity, Biological Pesticides, Monitoring, Ecological Risk Assessments, Hazard communication.

We are focusing more and more on ecosystem management. I would think planning projects with those concepts in mind would be beneficial, if not necessary.

I would like to see a presentation covering ecosystem dynamism, showing how all ecosystems are dynamic and constantly changing, and that if we want to preserve or move toward a "desired future condition" then we need to consider all of the tools available to achieve it.

Long term implications of pesticide use. Long term effectiveness of pesticide use vs natural factors.

IPM. Non target impacts. Environmental fate.

Methods and chemicals for very site and plant specific use.

More emphasis on bio-rational materials, pheromones. Bio-control of pests including weeds, new tools.

Control alternatives - low "risk" - high "risk" ie, insecticidal soaps, oils, etc.

I guess there is a big fear of contaminating water supplies. Maybe some case studies where herbicide scares proved right or wrong.

How you incorporate pesticide use into Ecosystem Mgt. Effects on biodiversity and Forest Health.

Scoping/Public Involvement.

NEPA requirements in detail.

Info on effects of various pesticides, alternative strategies for their use, and alternatives to using them.

Pesticide use in non-evenaged management. Restoration (role of pesticides in) of landscapes after catastrophes. Details on how pesticides work on targets. Environmental fates - especially soil active pesticides. EPA's role. Cal. EPA's role. Risk assessment.

Don't DILUTE this course with other topics as listed above - stick to pesticide application - could add pheromone application.

More on fate and persistence in long-term.

Chemical pathways, modes of action, natural pesticides, more on inert label ingredients. Biological control. Improved ways of gaining public acceptance of pesticide use, risk assessments, and doing a better job with NEPA, FLPMA.

Non-chemical alternatives.

Drift management from both aerial and ground applications. Effect of drift on non-target species.

Role of pesticides in achieving these objectives. Many people believe pesticides interfere with achieving ecosystem management, but they are actually playing a vital role in ecosystem management and restoration when used properly.

Narrowing the interests of the field of attendees and incorporating more info on bio-control and project planning would be useful. T&E's, and exotic pests should be highlighted.

Need some expert discussions on laws which affect or are expected to affect our jobs. Good presentations on NEPA, CERUA (& SARA), RCRA, FIFRA (plus GLP), CWA, CAA, TSCA, ESA, etc., etc.

Pesticide use in relation to all mentioned subjects, plus TES.

Course should still cover the basics: calibration, characterization, drift sampling, formulation etc. These basic topics could be complemented by the latest information on biologicals, non-target effects, and alternative control techniques.

Specific information on materials and techniques available to effectively combat noxious weeds.

Pesticides applied with "surgical precision" (as opposed to broad scale programs such as gypsy moth control).

How to do detailed planning for pesticide application projects. Project design. Project execution. What do I need to do to have a successful pesticide application project.

I suppose how pesticides could be used to achieve their management objectives, or how pesticides conflict with them.

NEPA. I don't know, so much of ecosystem mgt. will rely on good, basic silviculture.

Same as before. Keep it operational - let the planning folks play the word games.

Control of exotic species.

Presentation of case studies to enhance or restore resource values where use of pesticides was integral part of successful mgt. Rx.

Greater emphasis on biorational pesticides. Broader coverage of pheromones. Other than the above, the course is still suited for this world of "ecosystem mgmnt".

The role of pesticides in ecosystem management. The effect of pesticides on biodiversity. Use of herbicides in wilderness areas. An update on biocontrol of insects, diseases, and plants.

11. Please rate each of the following pesticide-related course category or subject by placing an X under High, Medium, Low to indicate level of importance:

	<u>High</u>	<u>Medium</u>	<u>Low</u>
International consulting	5	16	54
Forest use pesticides in other countries	7	19	49
Risk assessment	51	23	1
Risk management	54	20	1
Risk communications	50	24	1
Integrated pest management	58	15	2
Insecticides	42	27	7
Herbicides	42	23	9
Biological pesticides	58	16	2
Biorational materials (Authors note: there was apparently some confusion regarding what this meant - several question marks appeared by it)	34	17	8
Aircraft calibration	37	22	17
Aircraft characterization	32	24	18
Ground sprayer calibration	37	29	8

	<u>High</u>	<u>Medium</u>	<u>Low</u>
Hand spray equipment	33	26	15
Pheromone use - theory and practice	37	28	10
Pheromones application equipment	33	28	14
Pesticide data bases, libraries, and other sources	34	35	6
Biological control of vegetation	43	21	9
Environmental enhancement with herbicides	36	25	13
Disease vector control on forest/ range lands	18	33	21
Pesticide selection	52	14	9
Pesticide adjuvants	31	33	10
T&E species	39	29	6
Environmental fate and accountancy of pesticides	58	16	1
Role of pesticides in Forest Health and Ecosystem Management	48	21	3
Spray drift management	40	30	6
Spray physics	17	41	15
Spray models for aerial and ground spraying	16	45	15
Pesticide regulatory issues	37	33	4
Human health and personnel protection	56	17	2

	<u>High</u>	<u>Medium</u>	<u>Low</u>
Spray deposit sampling	31	34	11
Sampling spray drift	31	33	11
Impact of pesticides on non-target organisms	54	21	0
Monitoring pesticides - study design and equipment for air-land-water	46	24	6
Incident Command System	9	34	31
Pesticide-use project planning	26	18	6
Insecticide projects	19	10	2
Herbicide projects	18	5	6
Handling, storage, transportation, and disposal of pesticides	35	33	5
NAPLAP	7	32	26
Role of pesticide coordinators	13	37	22

12. Are you interested in being considered in the future as an instructor at Marana?

Yes (28) - see list of names (Attachment A)

No (41)

13. Would you like to attend a refresher/update type course at Marana?

Yes (45)

No (22)

Perhaps (8)

No response (2)

14. Remarks:

Thank you for the opportunity to participate in the course. The course was a terrific opportunity for participants to share their experiences and for inter-agency exchange.

Thanks for asking!

Thanks for your follow-up! I really enjoyed the course and appreciate the hard work and planning all you folks did to make it a successful training session.

Thank you for including the Air Force.

But the best time is if and/or when I am being faced with a possible project in the near future, ie. if I am starting the planning in the Fall for a project next Spring - that is when I would like to have the refresher.

I enjoyed the course and it has really helped me in pesticide investigations.

I enjoyed the course but not staying at Marana!

I feel the course was basic in many ways. An advanced course with project planning would be of great help, including setup of a communications system.

I probably wasn't the right person to attend but I don't know who else would have benefitted. We are almost out of the pesticide business.

Really an excellent course. Maybe there is a way to solicit alumni for the topics they would feel are most needed and have them attend just short sessions. If not then I would recommend one of our new employees attend and bring back the info I feel is needed to update staff who have taken (the course).

I was a course student in 1989 and an instructor in 1991. I thought the 1989 course was excellent (though some of the "spray" information was more detailed than I can use/comprehend). I was delighted to see how you used the student evaluations from 1989 to make the course even better. One recommendation though, is that you send a detailed outline of

the course when you send out your invitations for nominees. It seems that some students came to Marana without much idea of what to expect.

This is an exceptionally good questionnaire. The course needs to be tailored more toward Regional and Forest Pesticide Coordinator needs. Project people such as gypsy moth receive this training but on special project training.

There was an awful lot of Southern forest perspectives that tend to be very different from Northern and Pacific NW needs/concerns. The course could benefit from less traditional/conservative, spray-is-the-way, "control" approach and highlight management and integrated strategies as the wiser approach.

This was one of the better courses I have taken.

I still frequently use the material I learned at Marana. It is a good course that puts all the aspects of pesticide use into one package.

I thoroughly enjoyed the course and found it very informative. The main problem is to select the topics of greatest importance to include. In our courses we put more emphasis on sprayer calibration and less emphasis on environmental monitoring. This reflects the needs as perceived in New Zealand. If the course is aimed at training instructors more practical experience is needed.

I would like to attend a refresher or more specifically an update course. The new issues that we are dealing with related to ecosystem mgt, exotics and biorational materials could use a lot of discussion and information sharing. There are a lot of people who question the role of pesticides in National Forest mgt. and we need to move forward to define their role and look for opportunities to develop new technologies in application to provide more tools for forests to use in Ecosystem mgt.

It has been seven years since I attended the course. I thought it was quite good then and I hear good things about the subsequent courses. Times are changing so it is good that you are looking at changing the course content but don't sell the field exercises short.

I feel that my knowledge of the technology of pesticide use is near state of the art due to continuing education required in CA. My greatest hurdle

is convincing "management" that the use of pesticides is safe and can be accomplished without causing great conflict with the public.

I suggest Hazardous Material Handling and Disposal be included as an important topic for this course.

In the Central States, herbicide use, if used at all, will be very site/plant specific with direct hand applications for controlling non-native plants in natural areas and nuisance plants in rec. areas. The main hold-up to use is the lack of a risk assessment and EIS for use on the Shawnee NF.

If an ICS carding system is developed. I would like to see more of a modular format.

Refresher course would be great!

Really enjoyed the course (taken in 1986)--but have not had opportunity to use too much of what we learned.

Priority for additional training for our forest would be with district program mgrs. and forest pesticide management coordinator.

The pesticide program on the Kaibab has been terminated. Too much hysteria over pesticides and media misinformation to make a program possible. Managers are unwilling to commit the time and resources necessary to implement a program.

The course needs to be in sync with the State's pesticide licensing requirements. In Colo. you must take a certain number of courses to maintain proficiency in several different areas. I can't see paying for training costs that are not for state-approved courses.

What I remember from Marana (and I remember commenting on in the course critique) was the range in topics; from very basic application information to advanced topics in modelling, etc. There seemed to be little agreement on the audience.

We (the Forest Service) need the interaction and information exchange that takes place at refresher workshops. Perhaps just 1 week session but they should be held every 2 years at least.

I don't want to leave the impression that the course at Marana was not very good - it was. It just was not appropriate training for me to have in order to perform my function as PUC at RM. I learned a lot, but it was not knowledge that is critical to keeping track of the very small amounts of pesticides RM scientists use in their research programs.

Need to consider locations other than Marana.

Would like to have access to more advanced training for experienced personnel. More focused short-courses.

This questionnaire is well organized and thought out, just like the course was. Great to see high quality work in this important area.

Work I do is primary coordination legalese and is concentrated in the ground application of herbicide area - this has biased my needs responses. My greatest benefit from Marana was the written information and that could have been mailed.

Over the years of looking for help on spray projects, seeing well conducted projects and not-so-well conducted projects and learning a great deal from others with vast experience, I believe this course has a strong place in the pesticide mgt world. If we (govt. agencies) are going to do a project it must be conducted properly, safely and cost effective.

I've heard through the grapevine that it is being considered that the course will be split into modules eg. insecticide, herbicides, etc. I think this is a good idea. No need for folks to spend more time than necessary. I suggest an initial session for everyone to cover the topics of concern to all - then - split into separate modules.

My experience at Marana has always been a positive one - both as a student and instructor. I feel it's an excellent course - well planned and carried out.

Overall, my experience at Marana was beneficial. We do need however to fine tune this training some. Maybe we should target our audience, and structure or pull from a training package something that would fit that particular audience.

We do not use herbicides anymore, training of this type is not needed for most of Region 6.

If you consider the info gap back 10 years ago, this course is great!

Conclusion

Alumni of the national pesticide-use management courses conducted at Marana, Arizona were sent a questionnaire to evaluate how the course may have helped them on their job assignments. A total of 160 questionnaires were mailed with 77 responding. Of those responding 47 have staff assignments, 67 reported pesticide-use management within their assignment, 71 indicated they would recommend the course to others in their organization, and 24 rated the course very useful while 46 rated it generally useful. Responses to the narrative questions were very positive and supportive of the need for future training. The responses will be most helpful in planning and conducting future courses. A list of alumni who expressed an interest in being an instructor at future courses is included as Attachment A.

Attachment A

Following are alumni who answered Yes to the question "Are you interested in being considered in the future as an instructor at Marana?"

Margaret L. Jones
U.S. EPA
77 W. Jackson Blvd. SP-14J
Chicago, IL 60604

Lt. Col. Terry Biery
910 AG/DOS
3976 King Graves Road
Youngstown-Warren RGL APRT
ARS, OH 44473-0910

R. Ladd Livingston
Dept of Lands
State of Idaho
P.O. Box 670
Coeur D'Alene, ID 83814

Mark Quilter
State of Utah
Department of Agriculture
350 North Redwood Road
Salt Lake City, UT 84116

Patricia Sellers
USDA Forest Service, R-8
George Washington National Forest
P.O. Box 233
Harrison Plaza
Harrisonburg, VA 22801

Ralph Phipps
Shasta-Trinity National Forest
2400 Washington Avenue
Redding, CA 96001

John Nobles (no address given)

Mike Connor
USDA Forest Service
1992 Folwell Avenue
St. Paul, MN 55108

Linda Lyon
Division of Env. Contaminants
4401 N. Fairfax Drive, Suite 330
Arlington, VA 22203

John Anhold
USDA Forest Service
Ogden Field Office
4746 South 1900 East
Ogden, UT 84403

Scott Cameron
Texas Forest Service
Forest Pest Control
P.O. Box 310 (Hwy. 59 South)
Lufkin, TX 75902-0310

Jim Hyland
Alabama Forestry Commission
513 Madison Avenue
Montgomery, AL 36130

Ernest E. Abel, Regional Supervisor
Michigan Department of Agriculture
Pesticide & Plant Pest Management Division
350 Ottawa, N.W., Suite 2-C
Grand Rapids, MI 49503

Coleman Doggett
North Carolina Dept. of Natural Resources
Division of Forest Resources
P.O. Box 27687
Raleigh, NC 27611

Russ McKinney
USDA Forest Service
310 W. Wisconsin Avenue, Rm 500
Milwaukee, WI 53203

John Taylor
USDA Forest Service
Forest Pest Management
1720 Peachtree St., N.W. - Rm 925N
Atlanta, GA 30367

Julie Weatherby
Boise Field Office
1750 Front Street, Rm 202
Boise, ID 83702

Ken Gibson (bark beetle pheromone application)
TCFPM
Box 7669
Missoula, MT 59807

Mark D. Tucker
Dolores RD, San Juan NF
P.O. Box 210
Dolores, CO 81323

Don A. Clymer
Allegheny NF
P.O. Box 847
Warren, PA 16365

Jim Hadfield
USDA Forest Service - FPM
P.O. Box 3623
Portland, OR 97208

Paul Mistretta
USDA Forest Service - FPM
1720 Peachtree St., N.W. - Rm 925N
Atlanta, GA 30367

Larry Barber
USDA Forest Service
200 Weaver Blvd.
Asheville, NC 28804

Mike Rutty
Stanislas National Forest
19777 Greenley Road
Sonora, CA 95370

Tim McConnell
USDA Forest Service
P.O. Box 7669
Missoula, MT 59807

Alex Mangini
USDA Forest Service
2500 Shreveport Highway
Pineville, LA 71360

Pat Skyler
USDA Forest Service
2121C Second Street
Davis, CA 95616

John Ray
Forest Research Institute
Private Bag 3020
Rotorua, New Zealand 82179

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